

Triangle Similary: AA, SSS, SAS

Content Area: Mathematics (Geometry)

Grade Level: 8th grade

Projected Duration: 50 minutes

Stage 1 - Desired Results

Established Goals:

CS 5.0: Students prove that triangles are congruent or similar and they are able to use the concept of corresponding parts of congruent triangles.

CS 12.0: Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms.

- Prove certain triangles are similar by using AA, SSS, and SAS.
- Use triangle similarity to solve problems.
- Model with mathematics.

Understandings:

Students will understand that...

- Corresponding angles of similar triangles are congruent
- Corresponding sides of similar triangles are proportional
- Reflexive, symmetric and transitive properties hold for similarity

Essential Questions

- What is the difference between proving two triangles congruent versus similar?
- What is the minimal information needed to prove two triangles are similar?
- How do you use similar triangles to solve problems in the real world?

Students will know...

- Definitions of corresponding parts, similar, proportional, reflexive, symmetric, transitive and similarity statement
- The difference between congruent and similar
- How to prove that two triangles are similar using one of the following theorems or postulates: Angle-Angle, Side-Side-Side and Side-Angle-Side

Students will be able to...

- Explain the theorem or postulate that allows two triangles to be similar
- Solve proportions using the cross product property
- Calculate the missing side or angle using properties of similar triangles
- Simplify ratios
- Write the appropriate similarity statement given two similar triangles

Stage 2 - Assessment Evidence

Performance Tasks:

- Given a pair of similar triangles, students will be able to solve for the missing side length or angle using the given information.
- Given a pair of triangles with particular side lengths and angle measures, students will be able to prove if the triangles are similar.

Other Evidence:

- Assessment of student work
- Written explanations to justify work
- Teacher observations of students working on tasks
- Rubric related to performance tasks
- Exit ticket

Stage 3 - Learning Plan

Learning Activities

- Students will begin class with a brief warm up of solving proportions using the cross product property and naming the corresponding sides of two congruent triangles.
- The teacher will ask students to recall how they proved two triangles to be congruent. The teacher will list on the board the different theorems and postulates that were used to prove triangles as congruent: SSS, SAS, ASA, HL and AAS.

- The teacher will share that the class will now use a similar approach to prove two triangles as congruent: Angle-Angle, Side-Side-Side and Side-Angle-Side. The teacher will explain that these are short cuts to proving two triangles are similar.
- The teacher will review first how to identify the corresponding parts of two triangles.
- The students will be given an exercise to identify the corresponding parts of two triangles, the teacher will walk around the room and monitor student's work.
- The teacher will then explain the Angle-Angle similarity postulate. Students will be given an example that uses A.A. similarity that they will solve in their think-pair-share groups. The class will then come back together to discuss their results.
- The teacher will then present the Side-Side-Side Theorem and work out an example that uses S.S.S. to prove two triangles are similar. The teacher will remind students what it means for side lengths to be proportional.
- The students will be given an exercise to use either S.S.S. or A.A. to prove two triangles as similar, the teacher will walk around the room and monitor student's work.
- The teacher will then present the Side-Angle-Side Theorem and work out an example that uses S.A.S. to prove two triangles are similar.
- The students will be given a set of four problems to work out in their Think-Pair-Share groups. They will have to differentiate which theorem or postulate to use. The teacher will walk around the classroom and monitor student work and answer questions.
- An exit ticket will be given where students will write the big idea they learned from the lesson and what questions remain unanswered. There will also be a brief computational problem that asks students to find the missing side lengths of two similar triangles.

Extension Activities

- Students will begin problems #1-10 from pg 475 of the Burger (2008) text in class if time allows and will complete the problems at home. The teacher will review the problems in class the following day.

Differentiation

- For students who are English-learners or low-performers, the teacher will provide a graphic organizer flowchart to help students visualize the thought process for proving two triangles as similar.
- For high-achieving students, the teacher will provide an additional "challenge" problem in the classwork/homework that uses three dimensional pyramids and asks students to prove the pyramids are similar.